

(b) a modified nucleotide sequence which hybridizes under stringent conditions to the complementary sequence of said nucleotide sequence (a) where the polypeptide encoded by said modified nucleic sequence maintains all of said N-methyl transferase enzyme activities.

2. (Twice Amended) The isolated DNA molecule as claimed in claim 1 wherein said nucleotide sequence (a) and said modified nucleotide sequence (b) can be hybridized under stringent conditions at a temperature ranging from 40° to 80°C for a time period ranging from several hours to overnight.

4. (Twice Amended) An isolated RNA molecule comprising either of the following nucleotide sequences:

(a) a nucleotide sequence encoding N-methyl transferase of SEQ ID NO:1 and having the N-methyl transferase enzyme activities of 7-methylxanthine N3 methyl transferase, theobromine N1 methyl transferase and paraxanthine N3 methyl transferase; or

(b) a modified nucleotide sequence which hybridizes under stringent conditions to the complementary sequence of said nucleotide sequence (a) where the polypeptide encoded by said modified nucleic sequence maintains all of said N-methyl transferase enzyme activities.

5. (Twice Amended) The isolated RNA molecule as claimed in claim 4 wherein said nucleotide sequence (a) and said modified nucleotide sequence (b) can be hybridized

under stringent conditions at a temperature ranging from 40° to 80°C for a time period ranging from several hours to overnight.

7. (Thrice Amended) An expression vector comprising the DNA molecule as claimed in claim 1 and a promoter for expressing N-methyl transferase encoded by the DNA molecule in plant cells.

14. (Twice Amended) The vector as claimed in claim 13, wherein the vector expresses an N-methyl transferase with 7-methyl xanthine N3 methyl transferase, theobromine N1 methyl transferase, and paraxanthine N3 methyl transferase activities in cells of at least one of microorganisms or plants.

17. (Thrice Amended) The plant cell, plant tissue, or whole plant as claimed in claim 16, wherein the vector is introduced by infection.

20. (Twice Amended) A method for producing a plant secondary metabolite selected from the group consisting of 7-methyl xanthine, paraxanthine, theobromine and caffeine comprising: culturing the transformed plant cell, plant tissue or whole plant as claimed in claim 16 to form a plant body, and culturing said plant body to produce a plant secondary metabolite, wherein said plant cell, plant tissue or whole plant is a Camellia or a Coffea plant cell, plant tissue or whole plant.

21. (Thrice Amended) A method for modifying the concentration of caffeine comprising: culturing the plant cell or plant tissue as claimed in claim 16 to form a plant body, and culturing said plant body to modify a composition of caffeine, wherein said plant cell or plant tissue is a Camellia or a Coffea plant cell or plant tissue.

23. (Thrice Amended) The method as claimed in claim 20, wherein said transformed whole plant is a Camellia plant or a Coffea plant.

27. (Amended) A vector encoding the RNA molecule as claimed in claim 4.